

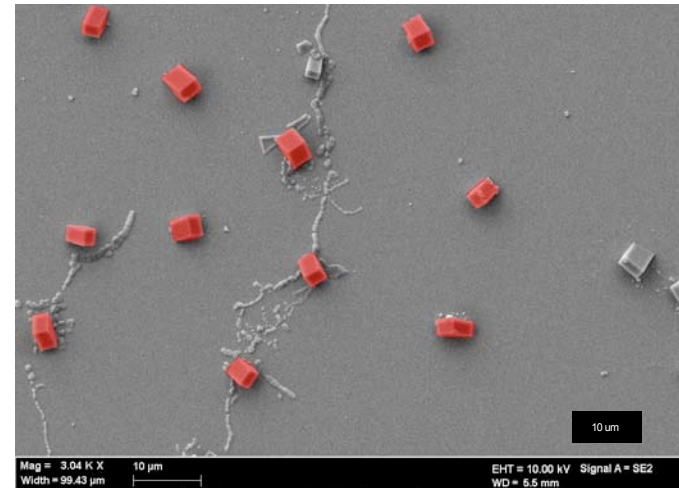
Orienting Crystal Growth Using Self-Assembled Monolayers

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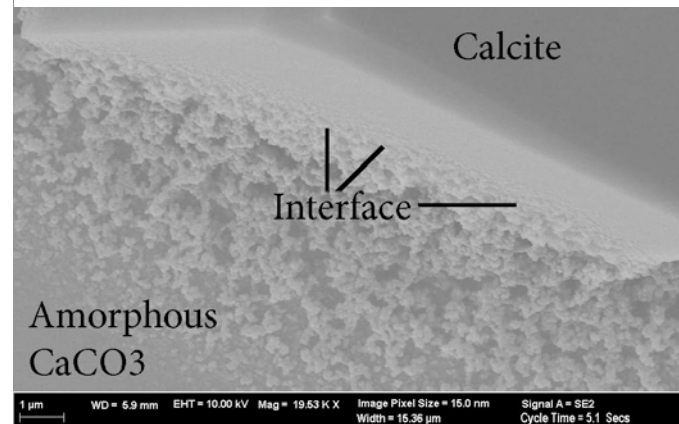
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My research has focused on how to control crystal growth using only what they're grown upon. By growing a monolayer, a 2-dimensional organic structure, on top of a metal such as gold, one can grow one specific orientation and if the metal is changed to silver, an entirely different orientation. My research has not only shown that this effect continues onto other metals such as palladium and platinum, but also to alloys of these metals. As well, changing the material of the monolayer changes the orientation as well. The ability to direct crystal growth allows us to possibly create perfect semiconductors and grow them *in situ* within an object, allowing transistors to be grown instead of manufactured.

Further, my research has strongly suggested that when calcite crystals form on an organic substrate they form first as an amorphous solid, then over time transition into a crystalline structure. With further research, this could provide deep insight into how other crystals in the body, such as bones or teeth, form. As we understand this better, we will be able to better heal broken bones or fill cavities.



A field of oriented crystals grown on a gold substrate. Red crystals indicate identical orientation.



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